

# Past and present ecological distribution of the yellowbilled oxpecker in South Africa

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The South African records of the yellowbilled oxpecker *Buphagus africanus* are reviewed and acceptable ones mapped. No evidence for breeding between 1907 and 1941 or after 1942 has been found though vagrants may enter the country from the north. The extinction is largely due to the inaccessibility of the preferred prey, Acarine ticks of the genera *Rhipicephalus* and *Amblyomma*, following the collapse of populations of buffalo and rhinoceros spp. coupled with eating poisoned prey due to arsenical dipping of domestic stock starting at the turn of the century. We recommend that yellowbilled oxpeckers be reintroduced to game reserves in which they used to live.

S. Afr. J. Zool. 1981, 16: 44 - 49

'n Oorsig van beskikbare rekords van die geelbek renostervoël *Buphagus africanus* in Suid-Afrika word gegee en gekarteer. Geen bewyse van broeiaktiwiteite tussen 1907 en 1941 of na 1942 is gevind nie alhoewel swerwende renostervoëls die land in die noorde kan bereik. Hulle het hoofsaaklik uitgesterf a.g.v. die onbekikbaarheid van voorkeur prooispesies nl. bosluise van die genera *Rhipicephalus* en *Amblyomma* wat weer deur 'n afname in die getalle van buffels en renosters veroorsaak is asook aan die gebruik van arseendipstowwe op gedomestiseerde diere aan die begin van die eeu en die gevolglike inname van vergiftigde prooi. Dit word aanbeveel dat geelbek renostervoëls weer ingevoer word na wildreservate waar hulle oorspronklik voorgekom het.

S.-Afr. Tydskr. Dierk. 1981, 16: 44 - 49

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Received 11 June 1980; accepted 26 August 1980

Oxpeckers (Buphaginae) are confined entirely to the Afro-tropical region. Both species of oxpecker occur in South Africa, the yellowbilled oxpecker *Buphagus africanus* and the redbilled oxpecker *B. erythrorhynchus*. Although the range of the two species is vast, the fact that they are wholly dependent on the presence of large domestic or wild ungulates means that their distribution is often patchy (Pitman 1956). Evidence of a shrinking distribution of both species over most of their former ranges is available (Clancey 1964, Attwell 1966). Siegfried, Frost, Cooper & Kemp (1976b) have indicated that the present distribution of *B. africanus* is not known in South Africa and that the species must be considered to be in danger of extinction in the country. This paper is an attempt to enlarge knowledge of the ecology and distribution of *B. africanus* in South Africa including the Homelands, Bophuthatswana, Transkei and Venda in a historical context. Lesotho and Swaziland are also covered by this review.

## Methods

An attempt was made to collate the existing literature for *B. africanus* from South Africa. Requests for information were sent to museums, universities, ornithologists, conservation bodies, societies concerned and scientific journals in an endeavour to trace unpublished records, specimens, eggs or relevant information. The Hluhluwe/Corridor/Mfolozi Game Reserve complex, Mkuze Game Reserve and the Kruger National Park were also surveyed for 33 days, 11 days and 10 days respectively to determine the present status of the species.

## Results

### Food preferences

Van Someren (1951) analysed seven stomachs of *B. africanus* in Kenya and found the most important food component to be ticks of the species *Rhipicephalus appendiculatus* (58,3%) and *Amblyomma variegatum* (35,5%). He also analysed 12 stomachs of *B. erythrorhynchus* and identified a high occurrence of *R. appendiculatus* (31,4%), *Boophilus decoloratus* (20,2%) and *Rhipicephalus pulchellus* (18,0%) while *A. variegatum* contributed only 5,7% of the ixodid ticks utilized. From these data it appears that both *B. africanus* and *B. erythrorhynchus* utilize *R. appendiculatus*. However, *A. variegatum* is utilized mainly by *B. africanus* and *B. decoloratus* by *B. erythrorhynchus*

indicating a difference in food preferences. The findings of Bezuidenhout & Stutterheim (1980) that the genera *Boophilus* and *Rhipicephalus* were the most important ixodids utilized by *B. erythrorhynchus* in the Kruger National Park supports this finding. They also found that in controlled experiments *B. erythrorhynchus* was reluctant to feed on the adults of *A. hebraeum*. It should be mentioned that *A. variegatum* does not occur in South Africa but is replaced ecologically by *A. hebraeum* (Howell, Walker & Nevell 1978).

The majority of Ixodidae found on the larger mammal species are not host-specific, but are found on a great variety of hosts (Zumpt 1964). However, it is also evident that some species show a pronounced preference for certain mammal species (Walker 1970). According to Walker (1970) cattle *Bos taurus/indicus* and buffalo *Syncerus caffer* are the favourite hosts of *A. variegatum* which have also been recorded parasitizing many other mammal species. Zumpt (1964) indicates that *A. variegatum*, *A. hebraeum* and *R. appendiculatus* parasitize both species of rhino but does not mention *B. decoloratus*. Carmichael (1976) examined buffalo in Botswana and found only one *B. decoloratus* on a total of 100 buffalo. Bezuidenhout & Stutterheim (1980) examined four buffalo in the Kruger National Park and found *Amblyomma* to be the dominant genus and no *Boophilus*. They also examined 15 impala *Aepyceros melampus* finding *B. decoloratus* the dominant species although *Rhipicephalus* and *Amblyomma* were found to a lesser extent. According to Walker (1970) cattle and antelope species are un-

doubtedly the chief hosts of *B. decoloratus* and following Howell *et al.* (1978) *R. appendiculatus* has an extremely wide host range.

From this information it appears that cattle and antelope species are favoured by *B. decoloratus*. This would explain the symbiont preferences of the Buphaginae. *B. africanus* with a preference for *Amblyomma* favours buffalo, rhinoceros *Diceros bicornis* and *Ceratotherium simum* and domestic cattle while *B. erythrorhynchus* with a preference for *B. decoloratus* associates mainly with antelope species but also with domestic cattle. As both *B. africanus* and *B. erythrorhynchus* utilize *R. appendiculatus* symbiont overlap occurs.

*R. appendiculatus* generally occurs in areas with an annual rainfall of at least 400 mm provided the vegetation cover is adequate. It apparently cannot survive on the open grass plains of the Highveld or the Karoo or any of the dry desert shrub regions. It is also absent from areas with more than thirty days of heavy frost a year. *A. hebraeum* occurs in the bushveld and Lowveld but not on the Highveld. This tick species needs the shelter of trees and bush as well as grass and therefore cannot survive in open grasslands (Howell *et al.* 1978). The distribution of these two preferred tick species compared with acceptable records of *B. africanus* is shown in Figs. 1 and 2.

#### Preferred mammalian symbionts

A preference for feeding on certain mammal species and the distribution of these preferred symbionts markedly influences the distribution of *B. africanus*. Stark &

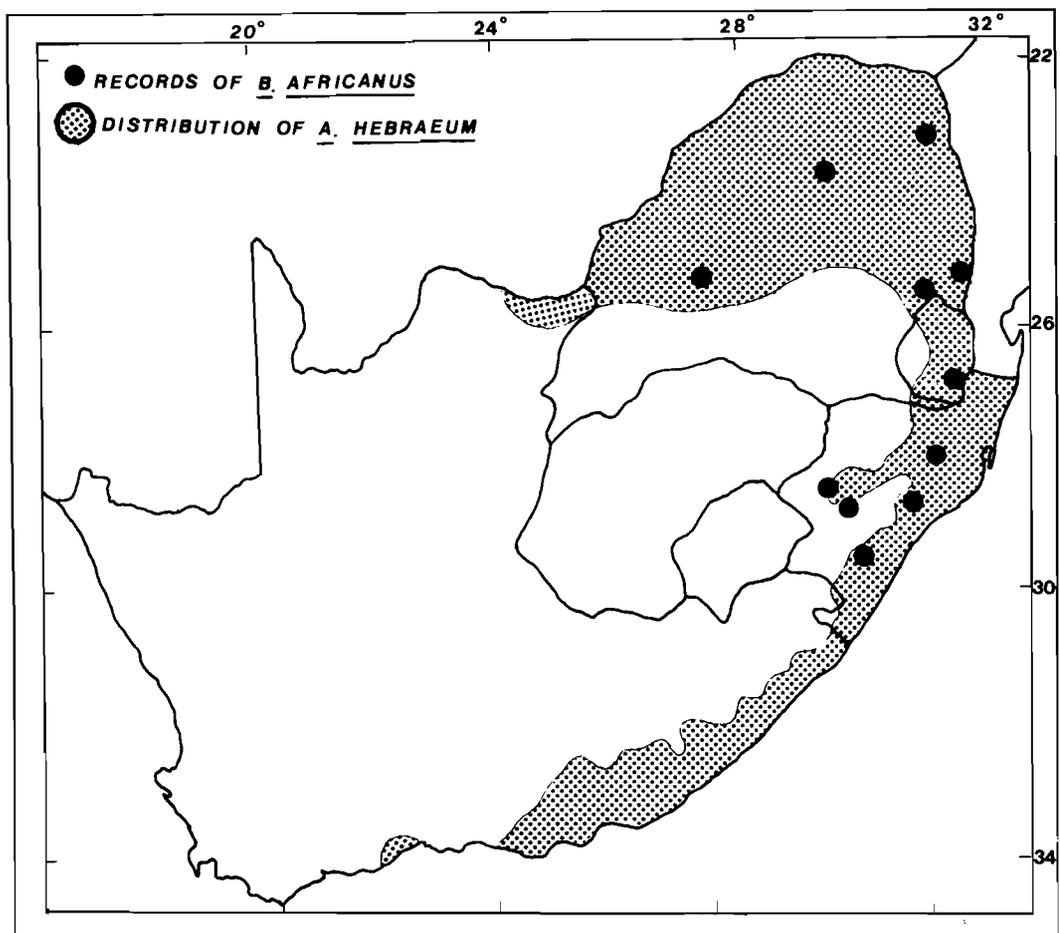


Fig. 1 Acceptable records of *B. africanus* compared to the distribution of *A. hebraeum* in South Africa.

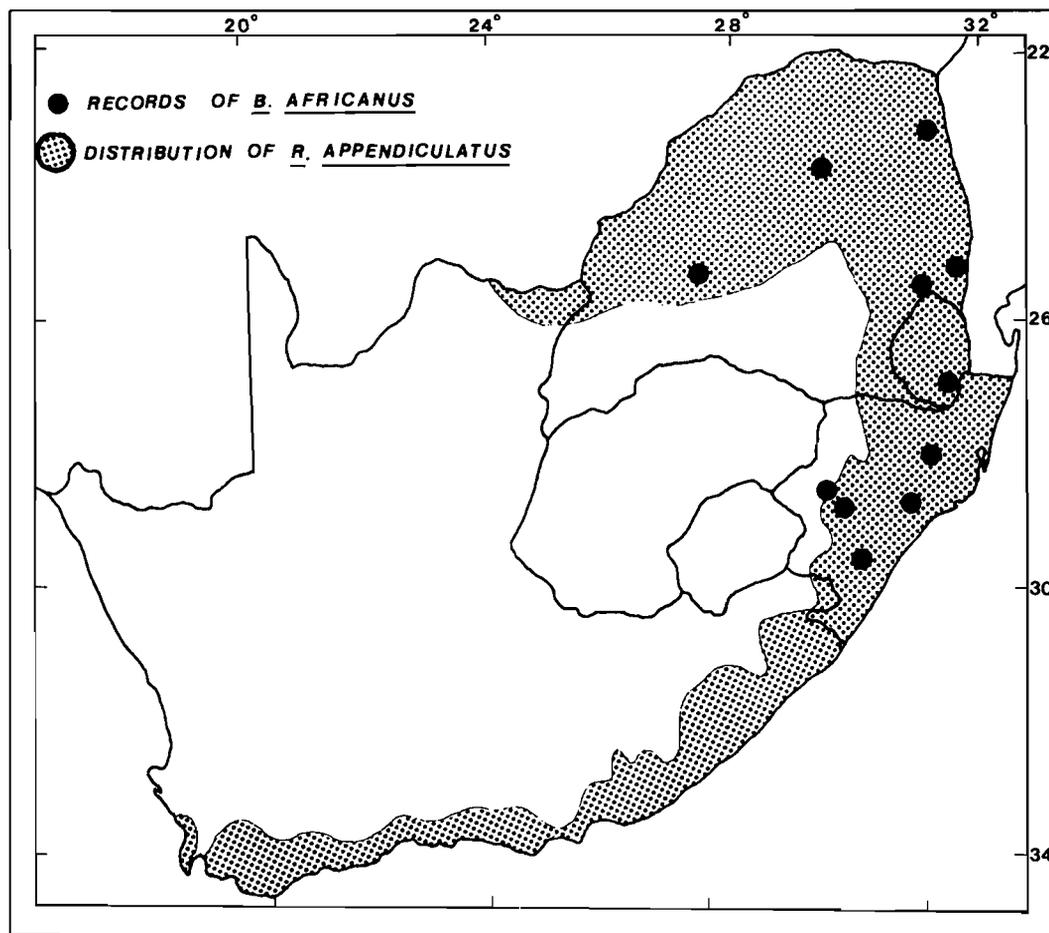


Fig. 2 Acceptable records of *B. africanus* compared to the distribution of *R. appendiculatus* in South Africa.

Sclater (1900) indicated that *B. africanus* favoured buffalo and black and white rhinoceros in South Africa. Swynnerton (1907) came to the conclusion that *B. africanus* is very common in areas with a high concentration of buffalo in Zimbabwe. Buskirk (1975) studied the symbiont choices of oxpeckers in the vicinity of Chief's Island, northern Botswana, and found that *B. africanus* occurred exclusively on buffalo. He also analysed the data of Attwell (1966) and again found a preference for buffalo and other sparsely haired or naked symbionts. This preference, *i.e.* buffalo and rhinoceros, was also found by Grobler & Charsley (1978) in the Rhodes Matopos National Park, Zimbabwe.

Buffalo were formerly found in the southern part of the Cape Province from Cape Town eastwards to Natal and Zululand. They were absent from the Karoo and Orange Free State but present in the northwestern, northern and eastern Transvaal. There seems to be no historical record of the existence of the white rhinoceros south of the Orange River. The species ranged from the Vaal River in the south and Zululand in the east, northwards to the Limpopo (Shortridge 1934). Bothma (1975) gives the former distribution of the black rhinoceros as the whole of southern Africa except the Orange Free State and southern Transvaal.

#### History of cattle dipping

Bekker (1960) has described the history of cattle dipping in South Africa. Dipping was initiated in 1890 in the vicinity of Grahamstown. The first dip tank in Natal was built in 1902. The outbreak of East Coast Fever in July

1903 at Ingwavuma resulted in more extensive dipping practice in Natal and Zululand. An outbreak of East Coast Fever at Komatipoort in 1902 also stimulated systematic tick control in the Transvaal. Arsenic was the acaricide used until 1940 and the concentrations and dipping intervals were enforced by Government regulations. In controlled experiments with *B. erythrorhynchus* in captivity, arsenic trioxide proved to be fatal within a 48 h period (Bezuidenhout & Stutterheim 1980). We think it reasonable to presume that arsenic has the same effect on *B. africanus*.

#### Records of *B. africanus*

##### Cape Province

Two alleged records are available from the Cape Province. Haagner & Ivy (1907) refer to a specimen in the Albany Museum (Grahamstown) collected by a local resident at Grahamstown but no date is given. This is probably the specimen identified as *B. erythrorhynchus* and cited by Skead (1965) as collected in July 1902 at Grahamstown. Pym (1909) recorded *B. africanus* in the company of wattled starlings *Creatophora cinerea* in March 1906 at King Williams Town but this observation is questioned by both Godfrey (1933) and Skead (1967). There is no satisfactory evidence that *B. africanus* has ever occurred in the Cape Province or the Transkei.

##### Orange Free State and Lesotho

Neither published nor unpublished records were found for the Orange Free State or Lesotho.

### Natal

Acceptable records of distribution for Natal and Zululand are shown in Fig. 1. A specimen of *B. erythrorhynchus* at Cambridge University Zoology Museum collected by E.C. Buxton in December 1880 'near Lebombo mountains' bears a label marked '. . . shot in company of *B. africana*' (C.W. Benson *in litt.* 1978). Woodward & Woodward (1899) described *B. africanus* as a 'rare' bird in Natal but found it in 'considerable numbers in the Black Umfolozi district of Zululand'. This is confirmed by Sharpe (1897) who mentions two specimens in the British Museum (N.H.) collected by the Woodward brothers at the Black Mfolozi but gives no date. It was March 1895 in the valley of the Umbegamusa (= Mbhekamuzi River at c. 28°08'S, 31°30'E) a right bank tributary of the Black Mfolozi (Woodward & Woodward 1897: 416, 1898: 228).

Three eggs in the Transvaal Museum, Pretoria, dated 23 October 1904 collected at the Hluhluwe River are labelled in a handwriting that corresponds with that of H.W. Bell Marley (A.C. Kemp *pers. comm.* 1978). The South African Museum, Cape Town, has an egg attributed to *B. africanus* obtained at Eshowe, Zululand, on 23 December 1906. According to a catalogue in the Natal Museum, Pietermaritzburg, they held two unsexed birds collected near there in 1907.

I.F. Garland (*pers. comm.* 1977) found a nest at Howick in 1942 which he attributed to *B. africanus* and T.B. Oatley (*in litt.* 1978) recorded a single bird on a donkey on the road between Giants Castle Game Reserve and Mooi River in October 1964. Pooley & Dixon (1966) on the birds of Ndumu Game Reserve classified *B. africanus* as 'Uncommon . . . some records for the western section' but do not mention *B. erythrorhynchus*. This record could not be confirmed by staff members of the Natal Parks Board (T.B. Oatley *in litt.* 1978, P.S. Goodman *in litt.* 1978). It appears to be a misidentification or misnaming of *B. erythrorhynchus*. According to Natal Parks Board staff no oxpeckers occur at present (1979) in the Ndumu Game Reserve (P.S. Goodman *in litt.* 1978, P. Hancock *in litt.* 1978).

A recapitulation of the records in Natal before 1904 (Woodward & Woodward 1897, 1898, 1899, Sharpe 1897) creates the impression that *B. africanus* was only found in fair numbers in the area between the White and Black Mfolozi Rivers (present-day Mfolozi Game Reserve) in Natal and Zululand. Layard (1871) stated that *B. erythrorhynchus* seemed to be the only oxpecker in the region of St Lucia Bay and Shelley (1875) who collected birds in the vicinity of Durban does not refer to *B. africanus* but mentioned that *B. erythrorhynchus* is common about Durban and Pinetown. Layard & Sharpe (1884) concluded that there was no record of *B. africanus* available for Natal. Stark & Sclater (1900) stated that it did not occur along the coast of Natal, occurs sparingly in 'Upper Natal' (south of the Tugela River) but becomes more abundant in Zululand.

Stark & Sclater (1900) reported that *B. africanus* appears to follow the larger game 'in their retreat before civilised man' which is an indication of a decline in numbers. The last confirmed record of *B. africanus* found for Natal and Zululand is the birds collected near Pietermaritzburg in 1907. Except for the unconfirmed

nest record of I.F. Garland in 1942 and the sight record of T.B. Oatley in 1964, no further records have come to our notice. Only *B. erythrorhynchus* was found during the present survey in the Hluhluwe/Corridor/Mfolozi Game Reserve Complex in May and June 1977. The Mkuze Game Reserve was also searched for a 10 day period in January 1978 with the same results. Clancey (1964) came to the conclusion that *B. africanus* appears to be extinct in Natal and 'almost certainly extinct' in Zululand. In the absence of any further evidence this must be accepted as the case.

### Transvaal

Acceptable records of *B. africanus* for the Transvaal are shown in Fig. 1. The specimen records are — Transvaal, collector unknown and donated in 1865 to the Royal Scottish Museum (Edinburgh) (I.N.J. Lyster *in litt.* 1978); Transvaal, collected in 1891 by H. White (Smithsonian Institute, Washington) (K.L. Pruitt *in litt.* 1978); Komatipoort, collected on 29 September 1896 by W.F. Francis and a reference to a mounted specimen collected in July 1877 in the Rustenburg district (South African Museum); Pietersburg, collected in 1933 by J.R. Ivy (Transvaal Museum); Rendall (1896) mentioned a male that was collected in the presence of six other birds in the Barberton district.

Ayres (1871) described *B. africanus* as 'exceedingly common from the Mariqua all along the Limpopo'. This corresponds with Buckley's (1874) description of *B. africanus* as 'common in the north of the Transvaal'. Harvey (1907) stated that *B. africanus* is exceedingly numerous in the Potchefstroom district and that up to twenty five birds were seen in the market square. According to Ayres (1871) however, *B. africanus* did not occur at Potchefstroom. Moreover, Harvey's account (*loc. cit.*) of *B. africanus* appears to be applicable to the cattle egret *Egretta ibis*: at least, there is nothing beyond the name used to link it to *B. africanus*.

Prozesky (1951) said he collected a juvenile *B. africanus* near Zeerust but the specimen in the Transvaal Museum is that of a juvenile *B. erythrorhynchus*. Elwell (1976) reported an observation in November 1975 near Rustenburg as 'Positively identified and confirmed'. Mr N Elwell was contacted but an attempt to trace the observer was unsuccessful. A.J. Hall-Martin (*pers. comm.* 1979) reported sightings of *B. africanus* at the junction of the Phugwane and Mphongolo rivers (23°02'S, 31°17'E) and between the Nkulumbeni windmills (22°57'S, 33°22'E) in the northern section of the Kruger National park in August and September 1979. In an attempt to confirm these observations the senior author conducted an unsuccessful ten day search of this area during December 1979. Although no grounds exist on which to reject these sightings, occurrence of a viable population is hardly even suggested.

From the available specimens (Rustenburg, Barberton, Komatipoort and Pietersburg) and following Ayres (1871), Buckley (1874) and Gurney (1887), it appears that *B. africanus* occurred in northern (north of the Magaliesberg) and eastern Transvaal. According to Howell *et al.* (1978) *A. hebraeum* occurs in the bushveld north of the Magaliesberg and in the eastern Transvaal. *R. appendiculatus* occurs in most areas north of

Krugersdorp, Pretoria and the eastern parts of the Carolina, Ermelo and Piet Retief districts. The distribution of these preferred tick species therefore corresponds with that of *B. africanus* and also with that of the preferred mammalian symbionts, buffalo and white and black rhinoceros (Shortridge 1934, Bothma 1975).

Except for the specimen collected in 1933 at Pietersburg, all the other specimens were obtained before or during 1896. Gurney (1887) published the observations of W. Ayres who collected birds in the eastern Transvaal in 1885. Ayres collected one specimen of *B. erythrorhynchus* at the Olifants River and remarked 'I met with but very few of these birds which seem to be disappearing as the large game become scarcer'. This is an indication that *B. africanus* were not present and that the numbers of *B. erythrorhynchus* were on the decline. However, W.F. Francis collected a specimen in 1896 at Komatipoort while Rendall (1896) mentioned a male collected at Barberton in the same year.

#### Adjacent countries

In Botswana *B. africanus* does not now occur south of 21°S (Smithers 1964) and Clancey (1971) does not know of it in southern Mozambique after c. 1910. In Zimbabwe it now occurs locally as far south as the Gona-re-Zhou National park at 22°S (Grobler 1979). The only record from Swaziland is a specimen collected by E.C. Buxton in 1872 near the Asuto River (= Usutu River) (J. Culverwell *in litt.* 1980) in southeastern Swaziland (Gurney 1873)).

#### Discussion

According to Shortridge (1934) and Howell *et al.* (1978) buffalo, black rhinoceros and the preferred tick species used to occur in the coastal areas of the eastern Cape. The biological reason for an absence of records of *B. africanus* is unknown. Much collecting of specimens and much writing on the natural history of the eastern Cape took place before 1850. The total failure to record anything as obvious as *B. africanus* makes nearly inescapable the conclusion that the species was not present there at the beginning of the historical period.

According to Howell *et al.* (1978) *R. appendiculatus* and *A. hebraeum* do not occur in the Orange Free State because they cannot survive on the open grass plains and according to Shortridge (1934) and Bothma (1975) neither did buffalo or black or white rhinoceros. The absence of both the preferred tick species and mammalian symbionts explains the absence of *B. africanus* in this area.

Vincent (1970) showed that buffalo, white and black rhinoceros were common in the area between the Black Mfolozi in the north and the White Mfolozi in the south and according to Howell *et al.* (1978) *R. appendiculatus* and *A. hebraeum* are also present. The buffalo population in the present-day Mfolozi Game Reserve area suffered a severe set-back during the rinderpest epidemic in 1898 but their numbers increased thereafter and a herd of about forty animals was sighted in 1916. Their numbers were again reduced during the trypanosomiasis control campaign (1941–1947) and in 1952 only four were known to survive in the reserve (Vincent 1970). A nucleus, however, remained in the nearby Hluhluwe Game Reserve with 400 buffalos in 1934 and an estimated

500 in 1940 (Bourquin, Vincent & Hitchins 1971). Both black and white rhinoceros were protected during the anti-trypanosomiasis campaign but suffered a severe set-back during a drought in 1933 when their numbers dropped to a dangerously low figure (Vincent 1970). In 1947 the intensity of shooting decreased but in April 1947 the area was sprayed intermittently with DDT until 1948 when it was replaced with BHC. This aerial spraying continued until April 1951. The effect of this spraying on the birdlife is not known (Vincent 1970) but would not have been beneficial.

Selous (1908 in Shortridge 1934) mentioned that buffalo used to be common in the Limpopo valley but were extinct by 1886. The rinderpest epidemic in 1898 decreased their numbers still further in the Transvaal and according to Stevenson-Hamilton (in Shortridge 1934) it reduced the population along the Sabi River to about twelve individuals. The last southern African white rhinoceros, outside the population in Zululand, was destroyed in 1895 in Zimbabwe which implies their extinction in Transvaal (Fitzsimmons 1925). With the construction of the Selati railway line in 1890, large numbers of black rhinoceros were destroyed in the eastern Transvaal and in 1900 only a few individuals survived in the Lebombo mountains (Shortridge 1934). It therefore seems that only a few individuals of the preferred mammalian symbionts of *B. africanus* survived at the turn of the century.

The observations of A.J. Hall-Martin in the Kruger National Park indicate that *B. africanus* may immigrate from surrounding areas as they occur in the nearby Gona-re-Zhou National park in Zimbabwe (Grobler 1979) across the Limpopo River. If so, this is a recent development because neither Pienaar & Prozesky (1961) nor Kemp (1974) record *B. africanus* for the Park. Furthermore, during a two year study (March 1973–December 1974) on the related *B. erythrorhynchus* in the Park by the senior author, no observations were made in spite of systematic searches. While the passage of time will probably ensure that *B. africanus* re-establishes itself as a breeding species in the Park there is no need to wait for this to happen. Grobler (1979) has shown that reintroduction of a viable population of oxpeckers is feasible. Since the species used to occur in the Park we RECOMMEND that the National Parks Board takes steps to reintroduce the yellowbilled oxpecker *Buphagus africanus* to the Kruger National Park. For the same reason we also RECOMMEND that the Natal Parks, Game and Fish Preservation Board take steps to reintroduce the species to the Hluhluwe/Corridor/Mfolozi Game Reserve Complex.

Siegfried, Frost, Cooper and Kemp (1976a) considered that the primary reason for the decline of *B. africanus* in South Africa was the replacement of nearly naked skinned mammals such as buffalo by more densely haired domestic cattle. This is certainly part of the story. Although the decline and extinction of *B. africanus* in its Natal/Zululand and Transvaal populations was not documented by contemporary study it is clear from the foregoing data on food and feeding sites that a collocation of factors led to their extinction. The first in time was the collapse of the population of buffalo and rhinoceros due to increased hunting pressure with the introduction of rifles. The birds' transfer to less favoured cattle which might have permitted their survival as a

breeding population was prevented by the rinderpest epidemic of 1896 with its disastrous effect on the numbers of cattle and buffalo. Just as cattle numbers were rising again arsenical dipping was introduced on a wide scale in the first decade of this century and eating ticks coated with arsenical dip kills this predator within 48 h. If a breeding population survived in South Africa after 1910, which seems doubtful, game eradication to control trypanosomiasis followed by aerial spraying with DDT and BHC would have been the final agent of extinction.

### Acknowledgements

The senior author conducted this study under the auspices of the Mammal Research Institute of the University of Pretoria. Thanks are due to National Parks Board and the Natal Parks, Game and Fish Preservation Board for permission to undertake studies in their reserves, Prof. J.D. Skinner for advice in the preparation of the manuscript, I.F. Garland, T.B. Oatley and A.J. Hall-Martin for unpublished information, the C.S.I.R., Rand Afrikaans University and H. Lewis & Co. for financial support. This work was carried out while the junior author was employed under the South African National Programme for Environmental Sciences (C.S.I.R.).

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